ELECTRICAL HAZARDS

Safety Training Goal: Understand the basic safety rules of electricity and to handle common electrical emergencies.

1. Introduction:

a. Electrocution is one of the leading causes of death in the workplace. More than half of these deaths are caused by two things:

(1) Defective electrical equipment.

(2) Failure to follow safe procedures.

b. Even if an electric shock doesn't kill you, it can still cause serious injury. These can include burns, damage to muscles and internal organs, and heart attack. A shock can be powerful enough to knock you down and cause injury from the fall.

2. Discussion.

a. How electricity works.

(1) In basic terms, electricity flows from one point to another by means of a conductor, which is any material that allows electricity to flow through it. Some materials, like metal, are better conductors than others, like wood and rubber. Materials that do not conduct electricity are called insulators. That's why electrical wires, which are metal, are covered with rubber or similar material, which serves as the insulation.

(2) Water and other liquids are good electrical conductors. Unfortunately, the human body is a good conductor of electricity, primarily because of the amount of liquid it contains. So when the body contacts another conductor, it can receive a current of electricity, resulting in an electric shock.

b. Electrical hazards.

(1) Hazards are created when there are opportunities for electric current to flow into the human body. The basic electrical safety rules apply to both on and off duty activities. Some hazards to watch out for include:

(a) Electrical cords that are damaged or have broken insulation. Never use damaged or defective cords or electric tools.

(b) Electric cords or connections near water or other liquids. Don't use electrical equipment near water (this includes handling the equipment with wet hands). Don't use cords outdoors unless they're waterproof. Be especially careful using metal

equipment near sources of electric current.

(c) Wear insulating clothing, such as rubber gloves, when working with electrical equipment.

(d) Leave all electrical repair or specialized electrical work to qualified personnel.

(e) Loss of grounding by using a three-pronged plug in a two-pronged outlet. Never disable a grounding system.

(f) An item of electrical equipment, such as a tool or a cord should not be used when it is not in good condition. When it can't be used without rigging up a system to make it work properly (such as using multiple extension cords or adapters), then it's probably an electrical hazard.

c. Proper response in an emergency,

(1) If there is an accident involving electricity, there are some basic rules on what to do and not to do:

(a) Don't touch someone who was has received an electric shock, the current may still be present and could flow into you.

(b) Turn off the power, if possible. If not, move the victim from the source of the current with a nonconducting object (wood is a nonconductor). Summon medical help.

(2) Electrical fires are especially dangerous. Never fight them with water or attempt to touch the burning object. The proper response is to turn off power and call trained firefighters.

(3) Electrical burns can be more serious than they might appear. Use sterile dressing and get medical help.

3. Conclusion.

Electricity should never be taken for granted. By using common sense, following the basic electrical safety rules and exercising proper caution, you can work safely with electricity.

Ground Rules for Electrical Safety

Do's and Don'ts

Do:

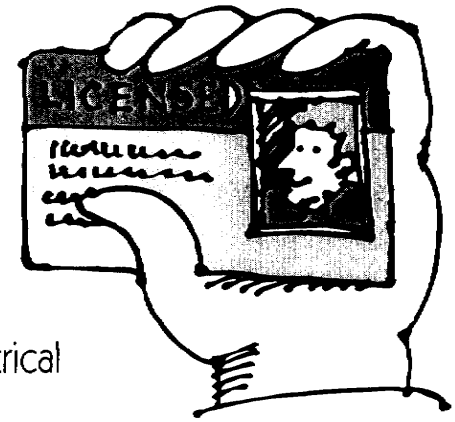
Stay away from exposed electrical parts unless you are a qualified worker.

Check that wire insulation is in good condition.

Keep machines and tools properly lubricated.

Use extension cords only when necessary and only if they're rated high enough for the job.

Use waterproof cords outdoors.



Use approved extension lamps only.

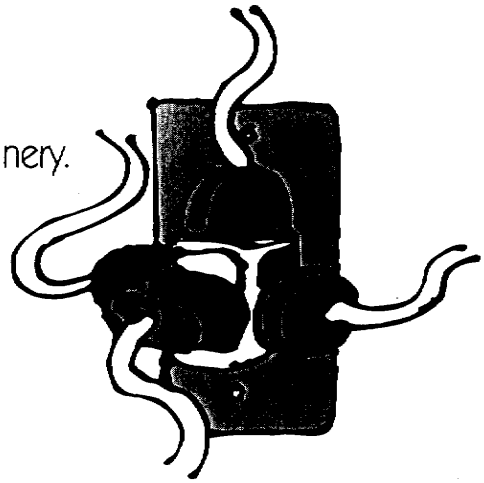
Leave at least 3 feet of workspace around electrical equipment for instant access.

Keep the work area clean. Be especially careful with oily rags, paper, sawdust, or anything that could burn.

Follow manufacturer's instructions for all electrical equipment.

Leave electrical repairs to qualified personnel.

Don't:



Don't overload outlets or motors.

Don't let grease, dust, or dirt build up on machinery.

Don't place cords near heat or water.

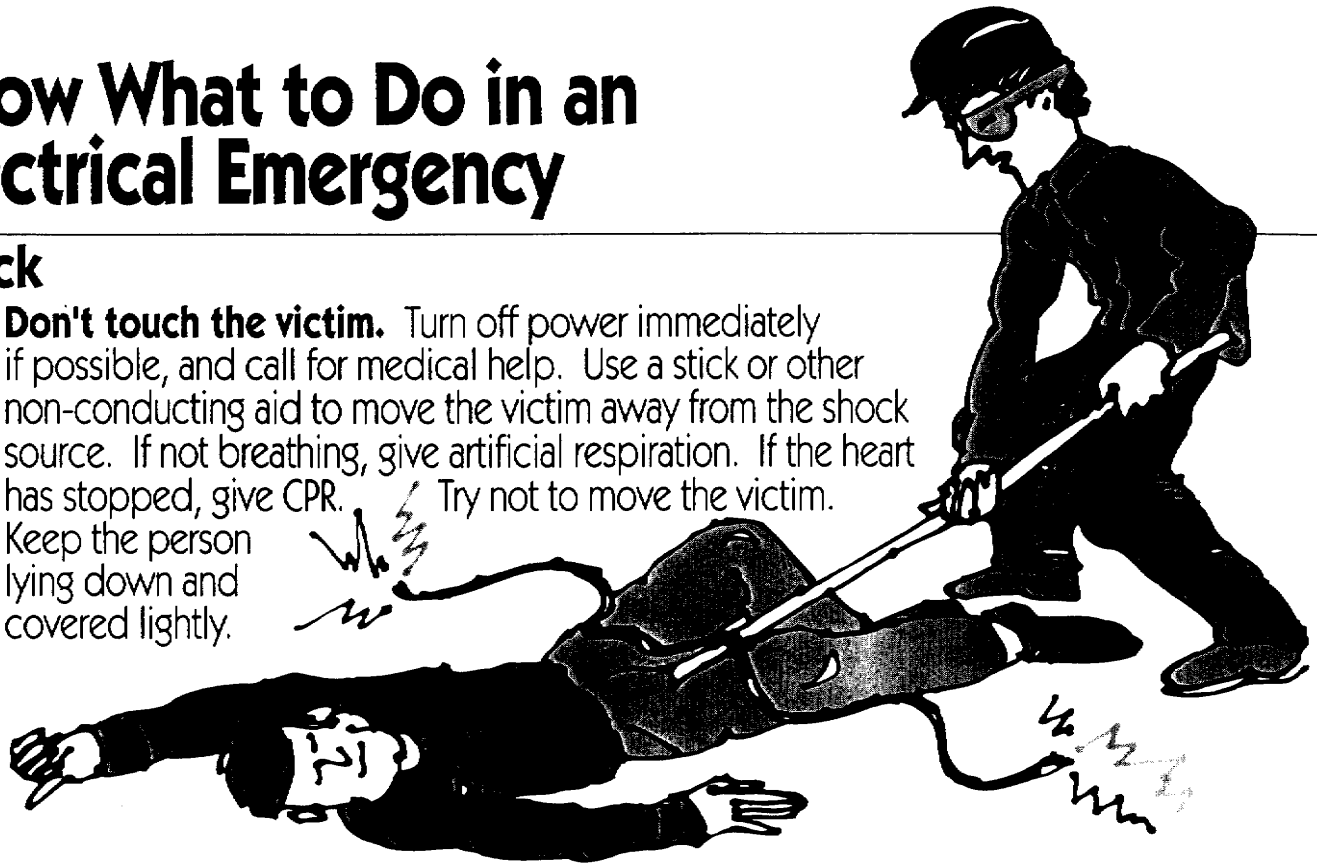
Don't run cords along the floor where they can be damaged.

Don't touch anything electric with wet hands.

Don't put anything but an electric plug into an electric outlet.

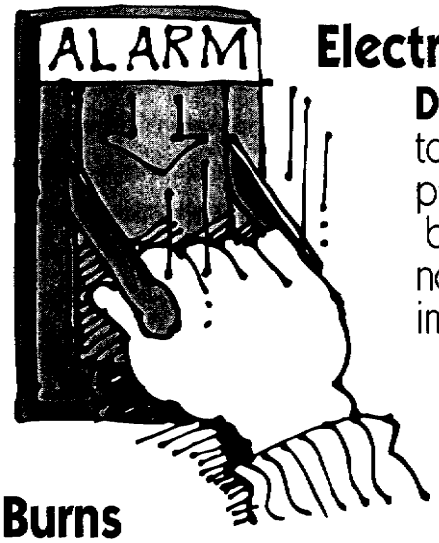
Don't use temporary wiring in place of permanent wiring.

Know What to Do in an Electrical Emergency



Shock

Don't touch the victim. Turn off power immediately if possible, and call for medical help. Use a stick or other non-conducting aid to move the victim away from the shock source. If not breathing, give artificial respiration. If the heart has stopped, give CPR. Try not to move the victim. Keep the person lying down and covered lightly.



Electrical fire

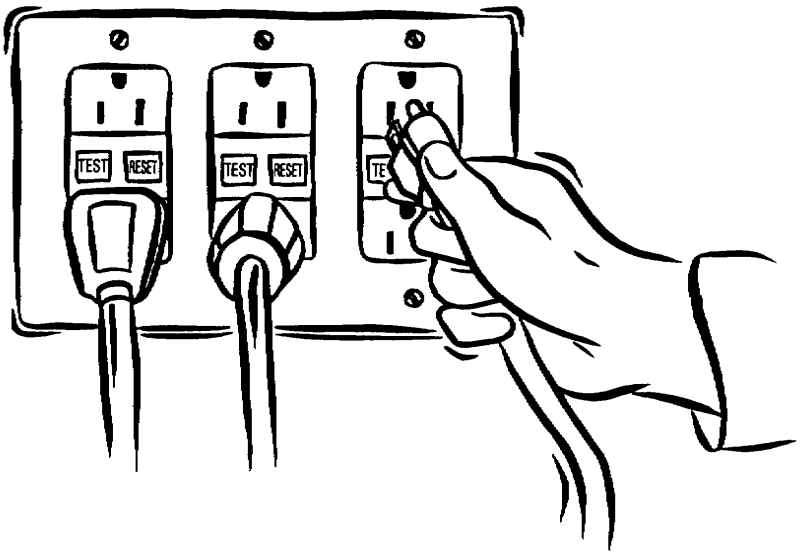
Don't use water or touch the burning object. If possible to do it safely, unplug or turn off the current. If the fire's small, put it out with a CO_2 or multipurpose ABC extinguisher, or baking soda. Always notify firefighters immediately.

Burns

For a minor burn, rinse with cool water and cover with a clean dry cloth.

Cover a major burn with a sterile dressing and get immediate medical attention.

Ground Fault Circuit Interrupters



Power tools can easily cause shocks, burns and fires if they're not in good working condition, if their insulation is inadequate or if they come in contact with water or moisture. A ground fault circuit interrupter (GFCI) provides extra shock protection by shutting off electricity if a ground fault occurs.

A GFCI protects against fires, overheating and destruction of wire insulation. However, it won't protect you from line-to-line contact hazards, such as direct contact with two live wires.

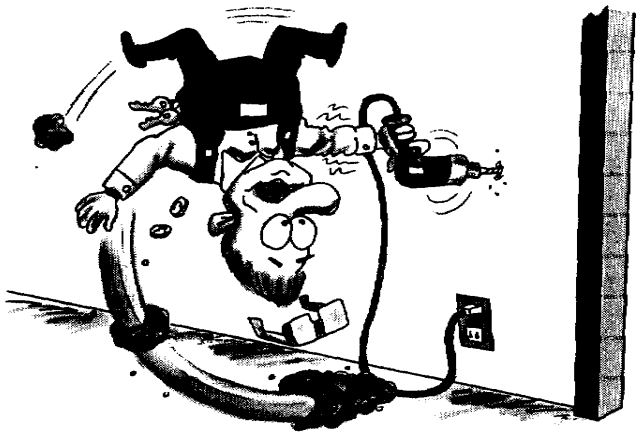
WHERE TO INSTALL A GFCI

Install GFCI outlets where power tools are used or wherever electrical equipment is used near water or dampness, such as outdoors. GFCIs can be wired into circuits at a panel box or used to replace ordinary outlets. They're mandatory on construction and other outdoor sites. You can also replace tool cords with ones that have a GFCI built in.

GFCIs PROTECT YOU

Make sure your power tools are double-insulated and that the outlets you use are grounded. While these measures may not be enough to protect you against the risk of damaging or cutting a power cord or from the hazards of working in damp areas, a GFCI is your best second-line defense against these common electrical shock hazards.

Portable Electrical Equipment



Portable electrical equipment uses voltages with the potential to injure and even kill. Faulty wiring, improper grounding and misuse of electrical outlets and plugs are just some of the hazards that may cause serious shocks and burns. Take the following precautions to avoid these and other electrical hazards.

GROUNDING

Make sure all electrical equipment is properly grounded, and plug power tools into grounded outlets installed with ground fault circuit interrupters (GFCIs). Check ground connections regularly for tightness.

WHEN YOU WORK WITH ELECTRICITY

- Inspect all electrical equipment, cords and outlets for defects before use. Use only equipment that's in good condition.
- Report unsafe conditions, such as defective cord insulation, poor connections to terminals, broken switches or plugs, sparking or overheating equipment and outlets in damp areas without GFCIs.
- Start and end from "off." Make sure the power switch is off before plugging in equipment. When you're finished, turn the equipment off before unplugging it to protect yourself and the next user.
- Don't kink, cut or crush any electrical cord. Never carry equipment by its cord.
- If equipment has a three-prong plug, use a three-slot extension cord. Never modify three prongs to fit two slots by removing the third prong. Use an adapter instead, making sure that the metal grounding piece on the adapter is connected to a grounded object, such as the screen on the receptacle cover plate.
- Keep water and electricity far apart. Don't use electrical equipment when your hands are wet or any part of you is touching water. If you must work in damp areas, use a GFCI.
- Don't strain equipment. Service equipment regularly and repair or replace as needed.
- Disconnect power for inspections, servicing or changing accessories.